



[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 33

[Docket No. FAA-2012-0745; Notice No. 33-12-01-SC]

Special Conditions: General Electric CT7-2E1 Turboshift Engine.

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed special conditions.

SUMMARY: This action proposes special conditions for the General Electric CT7-2E1 engine model. This engine model will have a novel or unusual design feature which is a combination of two existing ratings into a new rating called "flat 30-second and 2-minute OEI" rating. This rating is intended for the continuation of flight of a multi-engine rotorcraft after one engine becomes inoperative. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These proposed special conditions contain the additional safety standards the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: Send your comments on or before [insert a date 60 days after date of publication in the Federal Register].

ADDRESSES: Send comments identified by docket number FAA-2012-0745 using any of the following methods:

- Federal eRegulations Portal: Go to <http://www.regulations.gov> and follow the online instructions for sending your comments electronically.
- Mail: Send comments to Docket Operations, M-30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE., Room W12-140, West Building Ground Floor, Washington, D.C., 20590-0001.
- Hand Delivery of Courier: Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, S.E., Washington, D.C., between 8 a.m., and 5 p.m., Monday through Friday, except Federal holidays.

- Fax: Fax comments to Docket Operations at 202-493-2251.

Privacy: Docket Operations will post all comments it receives, without change, to <http://regulations.gov>, including any personal information the commenter provides. Using the search function of the docket web site, anyone can find and read the electronic form of all comments received into any FAA docket, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the Federal Register published on April 11, 2000 (65 FR 19477-19478), as well as at <http://DocketsInfo.dot.gov>.

Docket: You may read background documents or comments received at <http://www.regulations.gov> at any time. Follow the online instructions for accessing the docket or go to the Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, D.C., between 9 a.m., and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: For technical questions concerning this proposed rule, contact Donna Mihail, ANE-111, Engine and Propeller Directorate, Aircraft Certification Service, 12 New England Executive Park, Burlington, Massachusetts 01803-5299; telephone (781) 238-7153; facsimile (781) 238-7199; email dorina.mihail@faa.gov. For legal questions concerning this proposed rule, contact Vincent Bennett, ANE-7 Engine and Propeller Directorate, Aircraft Certification Service, 12 New England Executive Park, Burlington, Massachusetts 01803-5299; telephone (781) 238-7044; facsimile (781) 238-7055; email vincent.bennett@faa.gov.

SUPPLEMENTARY INFORMATION:

Comments Invited

We invite interested people to take part in this rulemaking by sending written comments, data, or views to the docket. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data. We will consider all comments received in the docket on or before the closing date for comments. We will consider comments filed late if it is possible to do so without incurring expense or delay. We may change these special conditions based on the comments we receive.

Background

On September 10, 2009, General Electric applied for an amendment to type certificate E8NE to add the new CT7-2E1 turboshaft engine model. The CT7-2E1 engine model is a derivative of the CT7 engine family certified between 1977 and 2010. It is a free turbine turbo shaft designed for a transport category twin-engine helicopter. The CT7-2E1 engine will incorporate a novel and unusual feature which is the "flat 30-second and 2-minute OEI" rating. The applicant requested this rating to provide the increased power required for the rotorcraft performance. A special condition is necessary to apply additional requirements for the rating's definition, overspeed, controls system, and endurance test

because the applicable airworthiness standards do not contain adequate or appropriate airworthiness standards to address this design feature.

Type Certification Basis

Under the provisions of 14 CFR § 21.101(a), GE must show that the model CT7-2E1 turboshaft engine meets the provisions of the applicable regulations in effect on the date of application, except as detailed in paragraphs 21.101(b) and (c). The FAA has determined the following certification basis for CT7-2E1 model turboshaft engine:

1. 14 CFR part 33, "Airworthiness Standards: Aircraft Engines", dated February 1, 1965, with Amendments 1 through 20 except §§ 33.5(b)(4), A33.4(b)(1), and A33.4(b)(2) Amendments 1-25 applicable to the "flat 30-second and 2-minute OEI" rating. The applicant will voluntarily comply with § 33.28, Amendments 1-28 for the EECU, FMU and AISBV.
2. 14 CFR part 34, Amendments 1 through 4, § 34.11 "Standard for Fuel Venting Emissions".

Under the provisions of 14 CFR 21.101(d), if the FAA finds that the regulations in effect on the date of the application for the change do not provide adequate standards with respect to the proposed change because of a novel or unusual design feature, the applicant must also comply with special conditions, and amendments to those special conditions, prescribed under the provisions of § 21.16, to provide a level of safety equal to that established by the regulations in effect on the date of the application for the change.

The FAA issues special conditions, as defined by 14 CFR 11.19, under 14 CFR 11.38, which become part of the type certification basis as specified in §§ 21.17(a)(2) or 21.101(d).

Special conditions are initially applicable to the engine model for which they are issued. If the type certificate for that model is amended later to include another related model that incorporates the same or similar novel or unusual design feature, or if any other model already included on the same type certificate is modified to incorporate the same or similar novel or unusual design feature, the special conditions may also apply to the other model.

Novel or Unusual Design Features

The CT7-2E1 turboshaft engine will incorporate a "flat 30-second and 2-minute OEI" rating, for use after the failure or shutdown of one engine, and for up to three periods of 2.5 minutes each on any one flight. Special conditions for the "flat 30-second and 2-minute OEI" rating are proposed to address this novel and unusual design feature. The special conditions are discussed below.

Discussion

The "flat 30-second and 2-minute OEI" rating is equivalent in some regards with the 2 ½ min OEI rating and in other regards with the 30-second OEI and the 2-

minute OEI ratings. However, the proposed rating differs from the 2 ½ minute OEI rating because it limits the number of occurrences per flight and mandates post-flight inspection and maintenance actions. The proposed rating is similar with the combined or joined 30-second OEI and 2-minute OEI ratings when they are equal. However, the existing standards are not adequate for this combination.

Similarly with the "flat 30-second and 2-minute OEI" rating, the 30-second and 2-minute OEI ratings were introduced to provide multi-engine rotorcraft with high power for short periods of time when an engine becomes inoperative during critical flight conditions. Existing airworthiness standards for the 30-second OEI and 2-minute OEI ratings were established based on the assumption that the two ratings will be selected together as a package, and that the 30-second OEI rating is higher than the 2-minute OEI rating. Because the 30-second OEI rating was assumed higher, specific requirements were established for only this rating and for the 30 seconds time period. When the 30-second and 2-minute OEI ratings are equal, these requirements must be extended to a total period of 2.5 minutes.

We identified the special conditions discussed below, that are based on a combination of existing regulations for the 2 ½ minute OEI rating on one hand, and the 30-second and 2-minute OEI ratings on the other. Under the provisions of § 21.101(d) the special conditions must provide a level of safety equal to that established by the regulations in effect on the date of the application for the change. The FAA determined that the type certification basis for CT7-2E1 engine model is up to and including Amendment 20 of part 33. We also determined that the part 33 standards up to and including Amendment 25 contain part of the standards for the "flat 30-second and 2-minute OEI". Therefore, we will not use special conditions when the requirements exist in later amendments, and instead we will apply these later amendments; refer to the above section titled "Type Certification Basis". These standards are (1) Section A33.4, Airworthiness Limitations Section, paragraphs (b)(1) and (b)(2) Amendments 1-25, and (2) Section 33.5 Instruction manual for installing and operating the engine, paragraph (b)(4) Amendments 1-25.

The special conditions are in addition to the requirements of the 30-second and 2-minute OEI ratings that remain applicable to the "flat 30-second and 2-minute OEI" rating., as follows:

- The special conditions extend the standards applicable to the 30-second OEI or 2-minute OEI for the 2.5 minutes time duration of the "flat 30-second and 2-minute OEI" rating. We propose special conditions by revising the time dependent requirements of §§ 33.27, 33.87(a)(7), and 33.88(c). The 2.5 minutes time duration for the proposed rating would affect the engine structural and operational characteristics that are time dependent, such as the values for transients, time duration for stabilization to steady state, and part growth due to deformation. In addition, we propose special conditions to extend the 30-second OEI rating requirements of § 33.67(d) for automatic availability and control of the engine power, from 30 seconds to 2.5 minutes. FAA proposes special conditions based on § 33.28(k) requirements of amendment 33-26, which are the same as those of § 33.67(d) amendment 33-18.
- Special conditions are required to account for the proposed rating of 2.5 minutes time duration during the endurance test conduct. For the 30-second and 2-minute OEI the test schedule of § 33.87(f) is divided among the two ratings.

We propose special conditions by revising the requirements of § 33.87(0 to ensure the test will be run for 2.5 minutes duration with no interruption.
Applicability

As discussed above, these special conditions are applicable to GE's CT7-2E1 turboshaft engines. If GE applies later for a change to the type certificate to include another closely related model incorporating the same novel or unusual design feature, these special conditions would apply to that model as well, providing the certification basis is the same or contains later amendments that satisfy the certification basis discussed in the section titled "Type Certification Basis".

Conclusion

This action affects only certain novel or unusual design features on the CT7-2E1 turboshaft engine. It is not a rule of general applicability, and it applies only to GE, who requested FAA approval of this engine feature.

List of Subjects in 14 CFR part 33

Air transportation, Aircraft, Aviation safety, Safety.
The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

The Proposed Special Conditions

Accordingly, the FAA proposes the following special conditions as part of the type certification basis for GE CT7-2E1 turboshaft engine.

1. PART 1 DEFINITIONS.

Unless otherwise approved by the Administrator and documented in the appropriate manuals and certification documents, the following definition applies to this special condition: "Rated flat 30-second and 2-minute One Engine Inoperative (OEI) Power," with respect to rotorcraft turbine engines, means (1) a rating for which the shaft horsepower and associated operating limitations of the 30-second OEI and 2-minute OEI ratings are equal, and (2) the shaft horsepower is that developed under static conditions at the altitude and temperature for the hot day, and within the operating limitations established under part 33. The rating is for continuation of flight operation after the failure or shutdown of one engine in multiengine rotorcraft, for up to three periods of use no longer than 2.5 minutes each in any one flight, and followed by mandatory inspection and prescribed maintenance action.

2. PART 33 REQUIREMENTS.

(a) In addition to the airworthiness standards in the type certification basis applicable to the engine and the 30-second and 2-minute OEI ratings, the special conditions in this section apply.

(b) Section 33.7 Engine ratings and operating limitations. Flat 30-second and 2-minute OEI rating and operating limitations are established by power, torque, rotational speed, gas temperature, and time duration.

(c) Section 33.27. Turbine, compressor, fan, and turbosupercharger rotor overspeed. The requirements applicable to 2 ½ minute OEI rating, except that following the test, the rotor may not exhibit conditions such as cracking or distortion which preclude continued safe operation.

(d) Section 33.28 Engine controls systems. Must incorporate a means, or a provision for a means, for automatic availability and automatic control of the flat 30-second and 2-minute OEI power for the duration of 2.5 minutes and within the declared operating limitations.

(e) Section 33.87 Endurance test. The requirements applicable to 30-second and 2-minute OEI rating, except for:

(1) The test of § 33.87(a)(7) as applicable to the 2 ½ minute OEI rating.
Note to paragraph (e)(1): For the purpose of temperature stabilization, the test period time is 2.5 minutes.

(2) The tests in § 33.87(f)(2) and (3) must be run continuously for the duration of 2.5 minutes, and

(3) The tests in § 33.87(f)(6) and (7) must be run continuously for the duration of 2.5 minutes.

(f) Section 33.88 Engine overtemperature test. The requirements of § 33.88(c) except that the test time is 5 minutes instead of 4 minutes.

Issued in Burlington, Massachusetts on June 28, 2012.

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Aircraft Certification Service.